MECHELECIV

THE GEORGE WASHINGTON UNIVERSITY
SCHOOL OF ENGINEERING

In This Issue

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- AFTER GRADUATION, WHAT?

December 1947

Edmund Thomas

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Alumnews by EMANUEL BECK

To All G. W. Engineering Alumni:

This is your page. Please drop us a card telling what you are doing and where. If you know of any graduates who are not on our mailing list, let us know about that and what they are doing. Have you done any notable work, changed your status, etc? Don't be modest; let us know and we will print it.

Philias H. Girouard—

Mr. Girouard received the University's Alumni Achievement Award for distinctive work in engineering this past May. He received the B.S. in M.E. with distinction at G.W. in 1926. In 1943, Mr. Girouard was named Chief Engineer of the Bureau of Ordnance of the Navy, the first civilian to be named to so high a position in the naval service.

For his contributions to the war effort, Mr. Girouard has received the Distinguished Civilian Service Award, the Navy's highest civilian award and the Medal for Merit which is the highest award that can be made to a civilian by the President of the United States.

Mr. Girouard was recently elected President of the Engineer Alumni Association. He announced a gift of 200 dollars to the Mecheleciv by the association.

* * *

William J. Ellenberger—

B.S. in E.E. in 1930 and B.S. in M.E. in 1934 is now plant superintendent of the National Bureau of Standards.

Frederick W. Grover—

Ph.D. in 1907 retired in 1946 and was given the status of Professor Emeritus of Electrical Engineering of Union College. He is making his home in Schenectady, New York.

* * *

Martin A. Mason—

B.S. in Eng. in 1931 received the 1946 award for achievement in the engineering sciences of the Washington Academy of Sciences. He is a member of the Beach Erosion Board of the War Department and contributed distinguished service in erosion studies leading to successful beach invasions by Allied armed forces during the war.

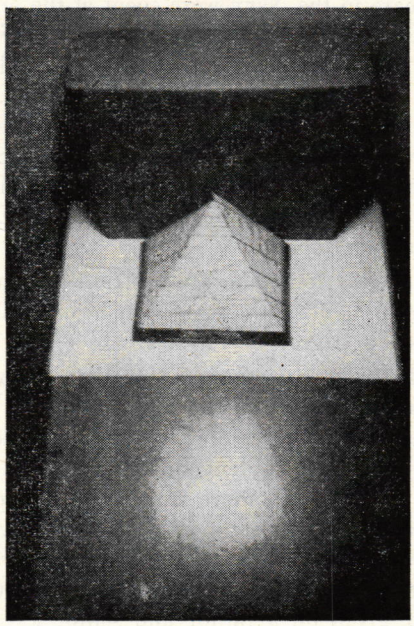
* * *

Anthony R. Barbuto—

B.S. in Eng. in 1943 is a civil engineer in the Washington office of the Great Lakes Steel Corporation.

Joseph F. Allen—

Mr. Allen received a B.S. in M.E. and joined the Warner & Swasey Co. During the war he served in the Naval Ordnance Laboratory where he shared in directing the development of mines and depth charges. After his war duties expired he rejoined Warner & Swasey as a project engineer. Mr. Allen made a notable contribution to metal-cutting research recently. There are four variables which influence the useful life of a carbide tipped cutter. The data showing the interelationship between these variables would fill a large volume. If one variable was changed and the others held constant the whole story could not be told. In this connection Mr. Allen developed



the Cutter Life Pyramid which shows the effect of all these variables concisely. Each of the lines inscribed on the faces of the pyramid should be considered as the intersection of two planes in space and each of the faces represents one of these planes selected to illustrate a practical range of each of the variables. The bottom surface and all planes parallel to it denote various constant values of cutting speed. One vertical side and its associated parallel planes represent areas of constant rate of feed per spindle revolution. The other vertical side and its paralll planes represent areas of constant depth of cut. The sloping face and its parallel planes denote areas of constant rate of metal removal. Thus the important points of cutting tool life are all plotted together. Again descriptive geometry played an important role in the development of engineering ideas.

FACULTY by HOLLIS K. KUSHMAN and ARTHUR MACHLIN

Originally, this page was to have been given over to brief summaries of the careers of three recent additions to the engineering faculty, but for different reasons, two of the subjects have disappeared from the campus. Mr. M. B. Greenough is no longer on the staff of the C. E. department, and, because of ill health, Mr. John N. Thomas has resigned as E. E. instructor. This leaves, of the original trio, Mr. Jerry S. Antel, the E. E. Department's newest full-time instructor.

Mr. Antel, originally from Cleveland, Ohio, was graduated here from Woodrow Wilson High School. He then studied electrical engineering at Virginia Polytechnic Institute for two years before being inducted into the Navy. His two years in the Navy were spent at the ammunition depot in Charleston, N. C., and the Norfolk Supply Department. Upon discharge he returned to college, graduating in June, 1947, with the degree of B.E.E., in the power option. While at V. P. I. he was elected a member of the honorary electrical engineering society. Eta Kappa Nu. Before coming to George Washington he worked in the Overhead Lines Division of PEPCO during the summer months.

Teaching has long interested Mr. Antel, and to further his training for this profession he intends to study for a Master's degree in Physics.

In addition to a preference for loud, colorful neckties, he has an active interest in the A. I. E. E. Upon the resignation of Professor Akers as counselor for the George Washington student branch, he took over the position. He feels that more students should participate in the activities of their engineering societies. Also, some provision should be made by the societies for freshmen who are unable to appreciate fully technical lectures which are usually given on a junior and senior level. Again, the societies should, on occasion, have purely social meetings, where the members could enjoy entertainment and refreshments. (Bring on the dancing girls.)

Most of the classes fromerly conducted by Mr. Greenough are now being taught by Mr. Nicholas C. Mandragos.

Although new on the faculty, from 1943 to 1945 Mr. Mandragos taught a defense course at George Washington on photo-elasticity. This method of determining stress in beams is both his specialty and his hobby. During this time he also taught numerous courses at the Navy Department on design of statically determinate and indeterminate structures.

He is a graduate of New York University, which he attended in the evenings while working in the civil engineering field. He has also taken graduate courses at Brooklyn Polytechnic Institute.

Mr. Mandragos has designed many government structures, including all the approach bridges to the Pentagon and the new heating plant at the foot of the M street bridge over Rock Creek Park. This particular building aroused local interest because its top floor was walled in while the lower floors were still a steel framework.

"Who's Who in Engineering" lists Mr. Mandragos as a member of the National Society of Professional Engineers, the Society of American Military Engineers, the Army Ordnance Association, the Washington Society of Engineers, the Society for Experimental Stress Analysis, and as a licensed professional engineer in New York State. Recently he has been writing a book on the solution of engineering problems.

His son, one of three children, is studying civil engineering at George Washington. "Denny" Mandragos spent the summer months working on a house he is building on his father's fifty acre farm in Maryland. Guess who designed it.

MORE FLYING SAUCERS? In a new project at the Westinghouse Research Laboratories, metal disks, which can stand a "pull" of 190,00 times their own weight before they fly apart, are being tested by spinning them at speeds up to 1,200 miles an hour to "explode" them. In so doing, scientists can determine the maximum strength of parts for newer and more powerful jet engines and assist in the development of new alloys.

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The Mecheleciv Staff would like this magazine to be more than a publication of articles chosen by the staff, written by the staff, and presented for you to read. It should be personally informative, as well as interesting. If any of you have any pet theories, perplexing problems, or even a favorite joke, write to us. You may have heard of some amazing new manufacturing process which would interest our readers, or you might have some scientific subject which you would like us to discuss.

This will not be presented as a "Letters to the Editor" page, but will be embodied in the magazine. Naturally we can not promise to answer each letter or request, but we do want your ideas and suggestions, and with your help we will try to put out a publication that is worthy of our Engineering School.

* * *

A George Washington Engineer boarded the train at Cleveland, and, deciding to grab a couple of winks, liberally tipped the six-foot porter to put him off at Washington.

"I'm a very sound sleeper," he said, "and you must take no notice of my protests. Seize me and put me out on the platform."

The next morning he awoke to find the train pulling into Richmond. Raging with fury, he found the porter and began to bawl him out in very strong language.

"Suh," said the porter calmly, "you've got a whale of a temper, but it ain't nothin' compared with the young fellow I put off at Washington."

WITH OUR SOCIETIES

ASCE

Thirty C.E.'s heard our first guest speaker of the year, Mr. Carrol Merriam of the Pennsylvania Water and Power Company, present a talk, with movie about the development to the Susquehanna River for Hydro-Electric Power. Mr. Merriam is an eminent engineer and gave us interesting side-lights from his experiences in this field.

So far the Chapter has taken in nineteen new members, bringing our roster to fifty-one actives. Judging from the interest shown at the last meeting, the society is rolling toward a big year. but there are still a lot of C.E.'s whom we need and would like to have with us. How about it, fellows. EVERYBODY out for the next meeting.

* * *

AIEE

At the November meeting, Mr. Robert Wiley of Sylvania presented a slide-illustrated lecture on illumination. A joint meeting with I.R.E. was held December 3rd.

On November 13, Professor Antell, Bernadine Dunfee, Jane Hanna, David Walsh, Charles Campbell, and John LeReche drove to Cleveland to attend the sectional meeting of the student chapters advisors and branch chairmen held at the Case School of Technology. The program got under way with an inspection tour of the hydraulics, civil, mechanical, and electrical engineering laboratories of the school, after which meetings were held. The major issues discussed were: the publication of a news sheet for this section, which includes twenty-three neighboring colleges, various incentives promoting greater cooperation between the student branches and the local sections, and various means by which interest may be fostered in the student chapters. The convention was appropriately terminated on the next day with a trip to Nela Park, the General Electric Lighting Institute.

* * *

ASME

The November meeting of the A.S.M.E. featured two films: "The Modern Mariner," loaned by the Cleveland Diesel Engine Division of the General Motors Corporation, and "The Helicopter" loaned by the Bell Aircraft Corporation.

At the next meeting, December 3rd, a talk on Radiant Panel Heating was presented by Mr. William Mayor of the A. M. Byers Company, Baltimore. Mr. Mayer illustrated his talk with slides.

IRE

At the November meeting, W. F. Dietz gave a talk on opportunities for engineers at Westinghouse and discussed their training program. The officers for this year are: Harold Thomassen, President; Reid Mayo, Vice-President; Matt Flato, Treasurer; and Emanuel Beck, Secretary. The branch enjoyed the joint I.R.E.-A.I.E.E. field trip to the Westinghouse plants at Baltimore and Landover, Maryland.

* * *

THETA TAU

In case you've been wondering what happened to those engineers who've been limping around like Kentucky mules on the Kansas plain, here's the scoop.

Saturday, November 8th, Theta Tau had a party at Deacon Ames' estate, and the victims discovered the hard way that slide rule exercises don't develop football muscles.

After internally applying several bottles of 'liniment' (ice-cold) and dozens of 'oyster-steaks' (a la Ritter), everyone was ready (?) that big Saturday nite.

Thank you, Professor Ames for your hospitality, we are looking forward to many more get-togethers.

* * *

SIGMA TAU

Recently the following men were pledged to Xi Chapter of Sigma Tau, the honorary engineering fraternity: John C. Nygard, Robert D. Sale, Vincent Hennessey, John Church, David C. Colony, Jr., James L. Shumaker, Matthew Polk, Phillip W. Osborne, James A. Sinsabaugh, Roy Johnson, Reginald L. Vasser, Elwood H. Mullins, Sherwin Rubin, Raymond S. Potter, Samuel H. Raker, Aubrey L. Burgess, Frank J. Soucek, Dwight F. Hastings, Dwight S. Ashley, Lawrence R. Brown, James C. Gregg, and Jean Jones.

These men will be initiated at a banquet on December 13, at the Hotel Lafayette, at which the active and alumni members of Xi Chapter will be presented.

B.I.M. Professor: "Who was the cleverest inventor?"

A.E.M.E.: "Edison. He invented the phonograph and the radio so people would stay up all night to use his electric light bulbs."

Old Workhorse in New Harness

BY JAMES LECROY

The fundamentals of the gas turbine have been known for a long time. Hero in ancient Greece used a very primitive type of gas turbine to turn a display in a temple, and many centuries later an English Bishop described the use of the gas turbine to turn a spit. In spite of this, many people have the idea that the gas turbine is a recent development. John Barber was granted an English patent on the gas turbine in 1791. Barber proposed to produce an inflammable gas from the use of coal, charcoal, or some other suitable fuel. A provision for cooling the gases by water injection to prevent overheating of the turbine parts with producer gas, may have originated the name "gas" turbine. His gas turbine included all the elements of the modern gas turbine except that the compressor was of the reciprocating type.

The first multi-stage gas turbine was patented in 1808 by John Dumbell of England. In his turbine the products of combustion traversed a turbine rotor comprising several rows of blading. Since his turbine consisted entirely of rotating blades without any stationary or guiding elements, his design could not be considered practical. The fuel for his turbine was coal.

The first gas turbine was not actually built until 1872 when a man named Stolze built and developed a multi-stage reaction gas turbine. This turbine is particularly of interest not only because it is a multi-stage reaction turbine but also because it incorporated the use of a multi-stage axial compressor, the first of its kind. The design was not a success. The reason for its failure is believed to be the lack of knowledge of fluid flow and the state of engineering development at that time.

Possibly the first patent in the United States covering a complete gas turbine was filed by Charles G. Curtis on June 24, 1895 (No. 635919). Mr. Curtis is the inventor of the Curtis Steam Turbine.

Charles Le Male applied for a gas turbine patent in 1901, and in 1903 he and Rene Armengaud of France began experiments on the turbine. The fuel for their turbine was kerosene. The 400 horsepower turbine was able to supply just enough power for compressing the air. The temperature of the turbine was held down to 1030°F. at the nozzles by water injection into the combustion chamber. Since the efficiency was only 3 per cent the net output was almost nil.

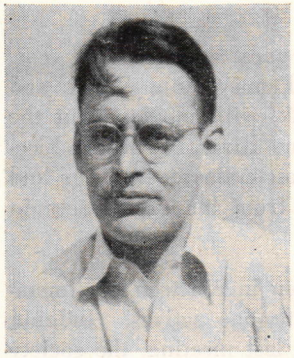
Most of the turbine research in the United States up to 1940 has been mainly with turbo-superchargers for diesels and heavy duty gasoline engines.

Considering the relatively short period of years during which actual experimentation with the gas turbine has been conducted, much has been accomplished. The jet propelled airplane of today would be of little or no value without its turbine, for it is through the rotation of its turbine and consequently the rotation of its compressor unit that the jet receives the air needed for combustion. Turbo-jets today obtain a thrust of from one to six thousand pounds and a speed of from 16 thousand to 18 thousand revolutions per minute.

Gas turbine fundamentals are old, but development and applications are in their infancy. Perhaps when atomic energy is harnessed for power the prime-mover will be the gas turbine.

DOC BLANCHARD

BY ARTHUR MACHLIN



As living proof that the Physics Department is not prejudiced against engineering students, we offer Don "Doc" Blanchard. Simply by getting the highest average in Physics 6, 7, and 8, Don earned the James McBride Sterrett, Jr., Prize and the "Approbation of the Physicists." To clinch the deal and justify their confidence in him, he copped an "A" in Physics 55, a course which many engineering students think is harder than Freshman English.

To show that he wasn't a whiz in physics alone, "Doc" has a medal from Ye Olde Sigma Tau Fraternity, the honorary engineering society. This bauble was presented to him for having the highest scholastic standing for the freshman year in the School of Engineering. A straight "A" average, no less!

Now a senior, Don is a member of Sigma Tau, Vice-President of the A.S.C.E., and Regent of Theta Tau, the professional engineering society. He also gets weekly awards of dollars and cents from the Gas Company for his part-time services as a heating engineer.

Mrs. Blanchard, formerly Adrienne Milner of Salt Lake City, deserves much of the credit for her husband's enviable record. They were married in September, 1945, seven months after Don's discharge from the army, in which he had advanced from private to Reconnaissance Officer.

Education agrees with "Doc", it seems. After graduation he may study for a Master's degree in Physics, for —aside from civil engineering—math and physics (those favorites of all engineers) are his pet subjects.

A NEW APPROACH TO ENGINEERING EDUCATION

By Sherwin Rubin and W. J. J. Klein

Technical education is a dangerous thing! Society seeks protection from the menace of unprincipled physicians by requiring a course of study in the arts and humanities prior to medical education. Can it afford to require less of the modern engineer who is often turned out into society with an enormous potential for good or evil and an inadequate capacity to differentiate between the two. The facts brought out at the trial of the German scientists at Nuremberg emphasize this point most strongly, and F. A. Firestone, Editor of the Journal of The Acoustical Society of America, has the following thought-provoking remark to make in an article in the Proc., I.R.E., (May, 1946) entitled "Moral Reflections on the Nuremburg Trials," "Our services must not be fully available to support the warlike ambitions of groups of whose aims we disapprove, and it behooves us to be informed and to form opinions."

Since it is only through education in the arts and humanities that the engineer, as the physician, can learn to be informed and to form opinions, a change in the Engineering curriculum is herewith proposed, which is designated to attempt just that. It is not presented as a final solution, but it is an approach, and since in dealing with human beings, one never attains perfection, the first step will of necessity not be perfect.

The program presented herein is designed to strengthen the Engineering curriculum in regard to the humanities on the basic assumption that the art of Network Analysis is so far ahead of sociological techniques as to imperil our civilization if the gap is not closed. It is therefore proposed that the Engineering curriculum be lengthened to five years, and that the first two years consist of a pre-engineering course where in the humanities and the basic sciences and Mathematics will predominate. It is recommended that Mathematics be taught as two five-hour courses for the first and second semesters in order that Physics, which shall be taught the third and fourth semesters, may be taught on a mathematical basis so as to avoid duplication and insure the proper conception of physical phenomena from the beginning. Mathematics through Integral Calculus and elementary Differential Equations should therefore be studied during the first year. Chemistry will also be included in the first year.

Since no idea is of value unless it can be conveyed, English Composition and Speech are prime first year requirements. They should be combined so as to allow the student to practice presenting his own compositions orally. Such combination should result in a more efficient instruction in both subjects. Literature is a necessity, and should be conducted so as to be a live subject which will cause the student to do further reading of literature on his own, after the course is completed. None of the

(Continued on page 8)

(Continued from page 7)

courses should be allowed to take up so much of the student's time as to become a burden and cause difficulty in other subjects and a loathing for the particular subject because of such experience. Furthermore, courses in Sociology, Political Science, and Ethics designed to develop an awareness of the world about us and a social conscience in regard to it, a course in American History designed to make the student proud of the American heritage and desirous of protecting it, and a further course in the culture of other nations, designed to instill a respect for the institutions and capabilities of other inhabitants of the earth, should be presented. Thus, the student will not become the ambassador of ill will that so many of our soldiers, through ignorance, were during the war years. The engineer abroad, supervising Marshall Plan installations, is a representative of America and can undo by his misconduct the good that should result from the sacrifices involved in our aid abroad. In the same tenor, a course in Esperanto should be included in order that international correspondence may be carried on through a medium of mental exchange that is free from national implications as possible. Last, but not least, the freshman year should contain an Engineering Orientation course, complete with examinations to determine a person's suitability as well as his capability in the field of Engineering.

The final three years of the Engineering curriculum would contain the Engineering courses usually present in the standard four year course. Motion pictures and other training aids should see more use, but that is not, as has been previously stated, the problem attacked herein. We can do a very satisfactory job on the bridges we build, but that time has come to pay closer attention to the traffic they bear. There should, of course, be room for Liberal Arts electives in the final three years, in hope of a successful indoctrination in the first two, creating a desire for further study.

In conclusion, let it be again noted that this is not, and does not pretend to be, the answer to the problem of engineering education in the modern world. It is an attempt to set down something concrete in the hope that action will be taken while there is still time.

Why You Studied Physics

A physicist is a person who passes as an exacting expert on the basis of being able to turn out with prolific fortitude indefinite strings of incomprehensible formulae calculated with micromatic precision from vague assumptions which are based on debatable figures taken from inconclusive experiments carried out with instruments of problematical accuracy by persons of doubtful reliability and questionable mentality for the avowed purpose of annoying and confounding a hopelessly chimerical group of esoteric fanatics referred to all together as engineers.

WALKER, GOULARD & PLEHN

- Paper -

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